Director of Central Intelligence

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Possible Soviet Responses to the US Strategic Defense Initiative

Interagency Intelligence Assessment

MEMORANDUM FOR: DCI 27 JUN 1984

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POSSIBLE SOVIET RESPONSES TO THE US STRATEGIC DEFENSE INITIATIVE

Information available as of 12 September 1983 was used in the preparation of this Assessment.

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PREFACE

On 23 March 1983, President Reagan called for a comprehensive and intensive effort to define a long-term research and development program to begin to achieve the ultimate goal of eliminating the threat posed by strategic nuclear missiles.

Though the media have given considerable attention to the issue and have focused attention on exotic space-based beam weapons—the so-called Star Wars systems—the President did not specifically mention any weapon concepts or basing:

— Ballistic missile defense systems could be on air, ground, and submarine platforms as well as on satellites; high-energy lasers, particle beams, or microwave systems could become elements of a national ballistic missile defense (BMD) system along with improved conventional-technology systems.

It appears likely that any strategic defense scheme will involve some combination of systems in a layered defense. A space-based directed energy weapon may be used to destroy enemy ballistic missiles in their boost phase; ground-based or space-based lasers or conventional weapons may be used to destroy buses and reentry vehicles in midcourse; ground-based beam weapons, missile interceptors, and other weapons may be used to provide terminal defense.

In attempting to neutralize the development and deployment of a ballistic missile defense by the United States, the Soviets will be able to select from a range of technical, diplomatic, military, political propaganda, and clandestine measures. Since this range is broad, and since the time scale (20 to 30 years) of the proposed US BMD effort extends well beyond anyone's ability to make accurate forecasts, we can claim no precision in evaluating the Soviets' course of action. We have instead focused on general principles and constraints in the areas of politics, military doctrine, and Soviet research and development practices that will influence their response to a US BMD system. Subsequently, we identified a variety of military and technological options the Soviets could make at various times in the future. No attempt has been made to perform evaluations as to the relative advantages of one kind of system or device over another.

Note: This paper was prepared under the auspices of the National Intelligence Officer for Strategic Programs. It was submitted in support of [redacted] an interagency report in response to the President's strategic defense initiative [redacted] This paper was coordinated at the working level by the Central Intelligence Agency and the Defense Intelligence Agency.

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SUMMARY

In the near term, we expect the Soviets to rely principally on a concerted political and diplomatic effort first to force the United States to drop its ballistic missile defense (BMD) plans or, failing that, to negotiate them away. There are also certain limited military steps the Soviets could take initially for the purpose of improving their bargaining position and for preparing them for initial US deployment should it occur.

Over the long term, if the United States goes ahead with plans to develop and deploy its defensive system the Soviets will have a different set of problems. Assuming they know the likely structure and capabilities of US defensive forces, they will look for effective technical countermeasures.

It appears that there will be a large variety of possible measures the Soviets can choose from to preserve the viability of their ballistic missile forces. Intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) can be upgraded with new boosters, decoys, penetration aids, and multiple warheads. The signatures of these systems can be reduced and new launch techniques and basing schemes can be devised which make them less vulnerable to US missile warning and defensive weapon systems. These systems can also be hardened or modified to reduce their vulnerability to directed energy weapons.

The Soviets can employ other offensive systems, particularly manned bombers and long-range cruise missiles with improved penetration aids and stealth technologies, to assume a greater burden of the strategic offensive strike role and to exploit the weaknesses in US air defense capabilities.

The Soviets can continue development and deployment of their own ballistic missile defense systems. The Moscow antiballistic missile system can be expanded and improved, and a more widespread system deployed, with additional launchers, improved missile detection and tracking capabilities, and more capable interceptors. The Soviets can expand their ongoing efforts on directed energy weapons, weapons which also provide antisatellite capabilities which could be used against some space-based elements of a US BMD system. In most of the directed energy weapons technologies, the Soviets are now on a par with, or lead, the United States. They are likely to pursue these efforts

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regardless of whether the United States sustains its strategic defense initiative.

We believe it is highly unlikely that the Soviets will undertake a "crash" program in reaction to US BMD developments, but rather will seek to counter them by steadily paced efforts over the decades the United States will need to develop and deploy its overall defense. They will look for solutions that are least disruptive to their way of doing business and involve the least possible change to their planned programs. The Soviets are not likely to embrace a fundamental shift in the strategic environment entailing reliance on strategic defenses by both sides.

The Soviets could choose to allocate the necessary R&D resources and could obtain some flexibility for new types of deployment by adjusting other programs. They are likely to encounter technical and manufacturing problems in developing and deploying more advanced systems. If they attempted to deploy new advanced systems not presently planned, while continuing their overall planned force modernization, significant additional levels of spending would be required.[1] This would place substantial additional pressures on the Soviet economy and confront the leadership with difficult policy choices.

If, through some set of circumstances, the Soviets were faced with actual or impending deployment of a US system and had no effective military counter to it, we think there are various possibilities for Soviet actions, ranging from major arms control concessions, to threats of military action in other areas, to threatened attacks on space-based components of a US system, to sabotage against US facilities. In some extreme scenarios, the Soviets could carry out a massive attack against the US defensive system, although we think that to be highly unlikely, given the near certainty of thereby initiating general war with the United States.

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[1] The Soviets have extensive efforts in the advanced technology area applicable to strategic defense, but we do not know to what extent these are planned for deployment.

DISCUSSION

Political Pressure

1. The Soviets have already begun, and will continue, to try to prevent development and eventual deployment of US defensive systems, which have in recent years been the nearly exclusive domain of the Soviet Union, through a variety of political, propaganda, diplomatic, and negotiating tactics and active measures. They will attempt to avoid any major disruption in their strategic planning by using these approaches to solve their problems and will work strenuously to put themselves in the best possible bargaining position. We can expect the Soviets to:

— Mobilize existing resources for a targeted peace offensive, aimed at exerting domestic political pressure in the United States and NATO countries to forgo advanced ballistic missile defense (BMD) technologies completely, or at least to postpone their development indefinitely. Moscow will make use of the peace movement, the scientific community, and appeals to the defense and arms control concerns of NATO opinion leaders. As part of the campaign, the Soviets will be likely to extol the virtues of the Antiballistic Missile (ABM) Treaty and accuse the United States of undercutting its provisions.

— Utilize various international forums, especially those related to arms control interests, such as the UN disarmament and space committees and the General Assembly, or the Conference on Disarmament in Europe (CDE) which is planned to begin in January 1984. They could offer publicly to make strategic arms reductions talks (START) concessions of interest to the United States in return for a negotiated ban or limitations on BMD development. They might judge that the administration is under growing political pressure to reach a START agreement and would accept a Soviet offer of this type. But Moscow would be very reluctant to offer the kind of offensive forces concessions the United States is looking for, probably preferring to take its chances on thwarting US BMD plans by other means.

— Continue their major arms control campaign to ban all weapons from space and to attempt to resume talks with the United States on limiting antisatellite (ASAT) weapons. Last spring, General Secretary Andropov reiterated the 1981 Soviet proposal for a UN treaty banning all weapons in space. The treaty would prohibit acts that destroy, damage, disturb, or change the trajectory of any satellite belonging to a treaty member who was in compliance with the treaty's ban on weapons. More recently, Andropov unveiled a new initiative to prohibit testing and deployment of space-based weapons, eliminate existing ASAT systems, and ban development of new ASAT systems. Embodied in a draft treaty submitted to the UN and more ambitious than the 1981 effort, this new Soviet initiative reflects Moscow's concerns over prospective changes in the military balance in space, especially with regard to BMD. Soviet initiatives have been somewhat successful in stimulating worldwide concern about an arms race in space.

— Demonstrate Soviet will and capability to respond to the US BMD initiative and attempt to keep pace with the United States in any BMD race; this could provide them with important bargaining leverage. One way the Soviets might do this is to raise the issue of the ABM Treaty. They have already claimed that we are in the process of breaking the ABM Treaty with our efforts.[2] The Soviets may demand that we discuss this issue sooner, rather than later. The Soviets could also make some overt references to their ability to deploy conventional ABMs in the near term. A Soviet conventional ABM "breakout" would place the United States at a strategic disadvantage in the near term. The Soviets thus might calculate that the threat of immediate ABM breakout could be used to bring the United

[2] This is actually not correct: the ABM Treaty only bans the development of air, sea, space, or mobile land-based ABM systems. It does not prohibit research on such technologies.

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States to the negotiating table on something closer to Moscow's terms. While Moscow might accept a negotiated revision of the ABM Treaty, they would seek to rule out deployment of advanced technology BMD for the foreseeable future in any such agreement. At the least, such negotiating tactics would buy them some time to develop their own military response to a US defensive system.

Active Measures

2. The Soviets consider active measures [3] an offensive instrument of foreign policy, designed specifically to influence the policies of other governments in favor of the USSR. The classic techniques—press placements, disinformation, front organizations, friendship societies, and so forth—can be used to disrupt relations between states arrayed against the USSR. The United States is the primary target. Academicians, journalists, and other agents of influence have been used to conduct political influence operations.

3. We believe that the Soviets will employ measures to cope with the President's BMD initiative that could include:

— Attempts to cause divisiveness and unrest among the US allies by arguing that the US initiative is an attempt to abandon them and that the United States is reverting to a "Fortress America" policy.

— Attempts to force the administration to withdraw or step down the BMD initiative by trying to convince the American people that implementation of the President's proposal would seriously curtail US social programs.

— Claims that the United States is upsetting the strategic balance and planning for a nuclear war-winning capability, disrupting the peaceful coexistence between East and West which has been so successful in maintaining peace since the end of World War II, and is starting a dangerous new spiral in the arms race.

— Veiled threats of Soviet response, including statements implying that undefined countermeasures are already under way.

[3] "Active measures" is a Soviet term referring to activities worldwide that are intended to promote Soviet foreign policy goals, but which go beyond traditional diplomatic, propaganda, and military means. Such measures are intended to influence or subvert the policies of foreign governments, disrupt relations between other countries, undermine confidence in foreign governments and institutions, and discredit opponents of Soviet policy.

Potential Soviet Military Approaches

4. The Soviets will position themselves to compete effectively in a new strategic environment. They will probably seek to:

— Increase their efforts to obtain US and Western technology which may bear on the BMD problem and step up their intelligence collection efforts on US plans and intentions.

— Increase their investment in military R&D, strategic forces, and space programs. This could force them into explicitly trading near-term military capabilities for future capabilities, depending on the size of the initial effort and the resources required.

Also, they will possibly:

— Emphasize in their program the early demonstration of the potential to match and counter US BMD, in order to increase their bargaining leverage.

5. An area which we believe to be of great importance in conditioning the Soviet response is that of economics. They will be reluctant to divert scarce assets to expensive technological efforts in response to US advanced BMD unless they are convinced that such efforts are essential to maintaining their security and political position and that they have identified potentially viable counters. Such solutions are likely to be expensive not only in terms of Soviet defense budgets, but more important, if they involve major restructuring of their strategic offensive and defensive forces, in the degree of disruption they would cause throughout the military forces and command and control structure. In addition, the Soviets are increasingly less likely to go for big, overall changes to their posture, because they have more to lose if they invest in the wrong strategy.

6. Over the longer term, the Soviets could choose to allocate the resources necessary to sustain research and development of a large-scale advanced strategic de-

fense program. They could obtain some flexibility for new types of deployments by adjusting other programs. The resources devoted to strategic offensive and defensive programs make up only 20 to 25 percent of total military costs. Based on some recent experience, however, they are likely to encounter technical and manufacturing problems that are inherent in developing and deploying more advanced systems. If they attempted to deploy new advanced systems not presently planned, while continuing their overall planned modernization of strategic and general purpose forces, significant additional levels of spending would be required.[4] This would place substantial additional pressures on the Soviet economy and confront the leadership with difficult policy choices.

7. The Soviets will try to cope with deployment of US advanced technology BMD with the least possible change to their planned programs. Historically, the Soviets have proceeded at their own pace to develop any necessary counter to US systems and initiatives over the long term. They will look for solutions that are least disruptive to their way of doing business—those programs that are already under way or are consistent with present trends in their strategic force posture. This is not to say that large and expensive new programs would not be undertaken in response; rather in choosing among their options, the Soviets will prefer those which do not represent a radical departure from established patterns of strategic behavior. It is highly unlikely that the Soviets will undertake a "crash" program in reaction to US developments, but instead will seek to counter them by steadily paced efforts over the decades the United States will need to develop and deploy its overall defense.

8. Moscow will seek to maintain the effectiveness of its strategic offensive forces as the primary means of maintaining its strategic position. Measures consistent with this approach would include proliferation of warheads and launchers, mobility and covertness for more of its strategic forces, and development of passive or defensive countermeasures, such as boost phase decoys and booster hardening. These measures would represent a continuation of the current Soviet military approach.

[4] The Soviets have extensive efforts in the advanced technology area applicable to strategic defense, but we do not know to what extent these are planned for deployment.

9. The Soviets are not likely to embrace a fundamental shift in the strategic environment entailing greatly increased reliance on strategic defenses by both sides. On the one hand, according to Soviet military writings, only with a strategy that emphasizes offensive operations could the Soviets achieve their objectives in nuclear war. On the other hand, the Soviets insist that defensive operations are an essential component of a viable nuclear strategy. They see their offensive and defensive operations as closely coupled; by maintaining the initiative in offensive strikes, they can greatly reduce the burden borne by the defensive forces to attempt to limit damage and guard their warfighting capability. We have no reason to expect any major alterations in Soviet doctrine and strategy in the 1980s and beyond. They will not view strategic force trends as requiring them to reduce the offensive, counterforce orientation of their strategy in favor of some assured level of survivability, as would be implied by a defense-dominated strategy.

10. Even if the Soviets tacitly accept a regime of defensive emphasis in response to US development programs, they would be reluctant to depend on defensive technologies over the long haul to confer the strategic advantage they seek. Consistent with their dialectic approach, the Soviets would tend to view a mutual shift to strategic defenses as a temporary phenomenon in the ongoing superpower strategic relationship and not as a permanent solution to strategic problems. Thus, Soviet military planners would never stop working the problem of how to overcome US strategic defenses, and they would probably expect the United States to behave similarly.

11. Soviet planners would rely heavily on the diversity of their responses to frustrate US defensive systems. In the offensive forces area, this would probably mean increased emphasis on cruise missiles and manned bombers—areas of current major Soviet developments.

12. The Soviets are likely to attempt to develop means of neutralizing or significantly degrading US BMD by exploiting "weak links" in the system. Such an approach would be consistent with existing Soviet doctrine and practice. They are likely to look for options to develop offensive countermeasures to US BMD—in effect, a strategy of defense suppression. One possible outgrowth would be the adoption of a

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strategy of strikes against US defensive systems during the conventional phase of a conflict with the United States; space-based components would be particularly attractive targets. They probably would not rely on defense suppression alone, but would combine it with the kinds of steps outlined above to ensure that enough of their offensive forces could penetrate a degraded but still operative US BMD system.

13. The Soviets will attempt to develop their own advanced BMD, using programs they already have under way, even if the technology is somewhat inferior to US systems. (In some areas, such as most of the directed energy weapons technologies, the Soviets now are on a par with, or lead, the United States.) This would provide them a basis for later improving the system, while also furthering their political goal of remaining competitive with US developments. They are likely to pursue these efforts regardless of whether the United States sustains its strategic defense initiative. The Soviets are not confident that, over the long haul, they could match US technology if the United States makes a high-level sustained effort, and they would be reluctant to be drawn into a technological "race" with the United States. They would always fear a US breakthrough in offensive technologies that could override Soviet defenses and US achievement of a much better defensive system.

14. The Soviets will have to compensate for the threatened loss of their perceived strategic edge against the United States. The US defense initiative probably came as a surprise to Soviet planners, and they are probably not in a position to react quickly with major changes in their own strategic plans and programs.

15. While Moscow will continue to look for negotiated solutions to the problems presented by US strategic defenses, the Soviets are not likely to view arms control as their only, or even their best, hope. They may be economically pressed to carry out a full range of military responses, but they are not likely to make major arms control concessions to the United States strictly as a means of relief from any such economic stresses. The Soviets view arms control as but one of many instruments—political, diplomatic, and military—available to them in the pursuit of their strategic goals. Soviet arms control policy is well integrated into their overall approach to the United States and the rest of the world, and they are not likely to acquiesce in agreements which are fundamentally inconsistent with their strategic policies and plans.

16. Consider a set of circumstances arising at some future time in which:

- The United States intended to deploy defenses that appeared highly effective against ballistic missiles as well as against cruise missiles and bombers.
- The Soviets had not achieved a comparable defensive status.
- The United States had not greatly reduced its offensive forces.
- The Soviets had not achieved the offensive capabilities necessary to penetrate US defenses.

If this were to occur, which is highly unlikely, Moscow would be faced with a radical, and highly undesirable, shift in the balance of power. It is possible the Soviets would consider options such as the following:

- They could make a concerted last-ditch effort to stop deployment through arms control. Under the circumstances, the Soviets would be in a very unfavorable bargaining position. They would probably have to offer major concessions in other negotiating arenas (for example, START or MBFR).
- The Soviets could threaten to undertake military actions against US and allied interests in areas where the Soviets enjoy military or political advantages.
- The Soviets, citing danger to their supreme interests, could threaten to attack space-based components of the new US defensive system while they were still in a highly vulnerable stage of deployment. They would certainly accompany any threat to attack by intense political action and propaganda portraying themselves as the defenders of world peace. If the US satellite system included nuclear devices [redacted] 25X1 hen it is possible that such a propaganda campaign would enjoy some success.
- It is also possible, but very unlikely, that they would threaten to undertake military action or

sabotage against launch facilities or critical command, control, and communications elements on US soil. Since threats to attack US territory would entail a more serious risk of precipitating a war, the Soviets would be correspondingly reluctant to raise the possibility.

17. Finally, if despite all efforts to forestall and prevent deployment of a US system, the Soviets should be faced with an imminently operational, viable US strategic defense, while lacking effective countermeasures and a comparable defense system of their own, they would need either to accept a prolonged period of clear strategic inferiority to the United States or to take dramatic measures to redress the situation. Some possible measures include:

— Implementing their previous threats of an attack against the US defensive system. If this entailed a massive attack against sites in the United States, it would carry with it the near certainty of initiating general war with the United States. We think it highly unlikely the Soviets would take such massive action, even under the circumstances just outlined.

— Attempting, covertly, to destroy important parts of the US system, using techniques like electronic warfare or directed energy ASAT weapons. The ability to conduct such operations covertly is possible, given the likely complexity of the space environment in the next century.

— Emplacing nuclear or biological weapons in Western cities, and announcing that they will be employed if the USSR is attacked.

— Claiming to have built the ultimate destructive weapon, a "doomsday" device.

Soviet R&D Processes and Timelines

18. There are several features of Soviet weapons development practice that will be important in limiting the speed with which they can respond to US defense initiatives:

— To a greater degree than in the United States, applied "research" is distinct from weapons "development." However, applied research can, and often does, extend to the fabrication and testing of design alternatives—that is, well into the "6.3" stage of US weapons procurement.[5]

— Fully funded development ("6.4") of a Soviet weapons system is initiated only when the responsible design authority is assured that he will have appropriate technologies on hand which will allow the military's performance specifications to be met. While this does not mean that research on subsystems technologies will not be undertaken during development, it does mean that the principal system designer must believe either that the research is relatively low risk, or that alternative technologies are available.

— A consequence of conservatism in initiating system development is that major technologies tend to be frozen relatively early in development. Thus, a major new system deployed in a given year will incorporate the technologies of the Soviet state of the art eight to 12 or more years earlier.

— During system development, the Soviets adhere to an elaborate schema which, in fact, is formally codified in Soviet law. While this works well in bringing order to development projects, it is an additional major factor in making it unlikely that they will undertake "crash" programs.[6]

— The Soviets are persistent in the pursuit of program goals. We know of several programs that the Soviets have continued after major setbacks.

[5] The primary effect of acquiring technology from the West is to circumvent or accelerate "research" rather than "development." That is, acquired technology may allow the Soviets to initiate development sooner, but it does not have a great effect on development times per se. At most, it can be an alternative to subsystem research during system development. But even in this case, the designers will have available alternative, if less advanced, technologies to fall back on if Western techniques cannot be obtained.

[6] Under Khrushchev, a number of ambitious programs were undertaken in which research and development were run concurrently. Examples are the SL-X-15 moon rocket, very large wing-in-ground-effect vehicles, and the A-class submarine. All of these programs have encountered major problems (some catastrophic), and even when a system was finally deployed the overall development time amounted to almost 20 years. These unhappy experiences undoubtedly reinforce the Soviets' reluctance to try to short-circuit the orderly process which has served them, in the main, very well.

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19. We have found that one result of the Soviets' development practices is that they need considerable time to introduce technological changes throughout a force. The necessary time is, of course, dependent on the degree to which the changes represent new technologies or only different applications of old ones. Whether modifications to existing systems or completely new designs are involved is also a crucial factor. In general:

- Minor modifications to existing systems take about five years to enter a force.
- Major modifications take eight to 12 years.
- New systems based on existing or only moderately advanced technology take around 15 years from initial requirements to deployment.
- Systems based on new or significantly advanced technology, which requires substantial research before design inception, can take 15 to 20 or more years.
- Systems which the Soviets term "new in principle" require lengthy research programs preceding weapon system development and can take upward of 20 years to produce a fieldable system.

20. In the last two cases, the factor of technology transfer can be particularly important, since it enables the Soviets to piggyback on much more efficient Western research and initiate a design project considerably sooner than if they had to depend on their own rather sluggish research establishment.

Technical Responses

Land-based Ballistic Missile Systems

21. The Soviets have invested enormous monetary and human resources in creating the ballistic missile component of their strategic attack forces. They now possess four major design bureaus that develop these types of weapons and have several new and improved intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) in development. In addition, their military has structured their strategic war plans around ballistic missiles, and prizes the military advantages inherent in ballistic systems—the ability to strike decisive blows quickly and accurately over great distances, with a minimum of warning. For these reasons, we believe it very likely that they will try to retain ICBM and SLBM systems in at least the near term and midterm by employing technological fixes that will enhance the missiles' survivability in the face of US defensive systems. Due to their strong and experienced design teams, it is probable that they will be able to implement modifications to existing missiles quite soon (five to 10 years), followed by more effective systems further in the future.

22. In the near term,[7] the Soviets could seek to increase the survivability of their ICBMs or the number of weapons surviving by:

- Deploying larger numbers of boosters, decoys, and penetration aids.
- Continuing or quickening the present trend to solid-propellant missiles, which tend to be structurally less vulnerable to continuous-wave (CW) laser damage[8] and have higher acceleration than liquid-propellant ICBMs.
- Further fractionating (increasing the number of reentry vehicles) systems currently deployed or in development.

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[redacted]

[7] In the remainder of the paper, we define the "near term" to be the period to 1995, the "midterm" to be 1995-2005, and the "far term" to be after 2005. These definitions are meant for orientation and are obviously not to be taken literally.

[8] Note that many measures that would help against lasers would have little or no effect against particle beam weapons.

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23. In the midterm (1995-2005), the Soviets could undertake more radical measures to harden present types of missiles. Toward the end of the period, they could begin to deploy new missiles which have been designed to reduce the effectiveness of US defensive measures as the Soviets understood them in the middle to late 1980s:

— New guidance systems that would allow continuously rolling airframes could probably be developed, tested, and installed in existing missiles toward the beginning of the period. Continuous roll is estimated to be two to three times as effective as oscillatory role in increasing CW laser burnthrough times.

— Also in the first half of this period, current missile types could be modified with an ablative coating to further protect against CW laser attack. Studies indicate that for missiles of the SS-17, -18, and -19 classes a continuously rolling airframe with a thin ablative coating will increase burnthrough times by a factor of about 15 over the present systems.

— It is possible that some degree of X-ray hardening could be incorporated with an ablative coating on the postboost vehicle (PBV), thus reducing vulnerability as well as other lasers.

— Other laser hardening measures, such as a smokescreen, could be installed.

— First-generation boost-phase decoys could be deployed.

— Measures to reduce or alter the infrared (IR) signatures of booster plumes would also be possible.

— New PBVs that dispense RVs earlier than at present could be put on existing missiles.

24. New missiles appearing in the 15- to 20-year time frame might incorporate the following features:

— High-acceleration boosters that burn out below 100 kilometers, thus eliminating boost-phase vulnerability to X-ray and neutral particle beam weapons.[10]

— Airframes designed to minimize vulnerability to spot heating from CW lasers and impulsive loads from pulsed lasers.

— Multiple high-acceleration PBVs to minimize RV dispensing times and proliferate PBV targets.

— Maneuvering RVs to reduce accuracy degradation caused by early, rapid RV dispensing.

— PBVs designed to dispense many decoys per RV.

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25. In the far term, from 2005 onward, the Soviets will be able not only to refine responsive measures taken earlier, but also will have had time to perform research and development on radically new concepts and to deploy those which prove out:

— Highly fractionated, hardened, high-acceleration ICBMs could be developed as evolutionary follow-ons to first-generation responses of the late 1990s.

— Further development of boost-phase decoys and signature reduction/alteration techniques could make early characterization of an attack and weapon targeting very difficult.

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— New means of launching RVs, such as railguns and other electromagnetic devices, could eliminate boosters entirely.

— Nuclear rockets could be used in boosters capable of depressed (height less than 100 km) trajectory, perhaps very fast (greater than circular velocity) attacks.

— Missiles could be put in high Earth or solar orbit to be deorbited on enemy targets.

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[10] The beams from both X-ray lasers and neutral particle beam weapons are seriously degraded by passage through the atmosphere.

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Sea-Based Ballistic Missile Systems

26. Many of the measures to make the Soviet land-based ICBM force less vulnerable to defensive systems would be applicable as well to the strategic SLBM force.

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Ablative coatings of the airframes and continuously rolling airframes would be possible by the end of the century, as would initial measures to reduce or mask visible, infrared, and radar signatures of boosters, PBVs, and RVs. By the end of the midterm, new SLBMs designed specifically against currently proposed US defensive systems could be in test or the early stages of deployment. These, like the ICBMs of that time, could incorporate airframes designed to minimize vulnerability to CW and pulsed laser effects, high-acceleration boosters, and multiple PBVs that could rapidly dispense RVs and decoys. Advanced signature reduction techniques for boosters and RVs could also become available at this time.

27. SLBMs do possess peculiarities that both restrict possibilities for some responsive measures that are available to ICBMs and, conversely, offer some unique opportunities:

- By the early years of the next century, the Soviets could design, develop, and deploy depressed trajectory SLBMs that would not exit the Earth's atmosphere and would have very short times of flight, if launched from 3,000 to 4,000 km from their targets. The fact that such systems never leave the atmosphere would stress the capabilities of the defensive systems even more severely: X-ray and neutral particle beam weapons would be of little use against them. Moreover, such SLBMs would, by necessity for their own survival in flight, employ hardening measures which would also be effective against CW lasers. In addition to attacking time-urgent counterforce and countervalue targets, these weapons would be very useful for attacking ground-based components of the US BMD system, particularly command, control, and communications elements and interceptor missile launch sites.
- Boost-phase decoys would be more difficult to develop and might not be worth the space they would take on a submarine. (But decoys could be launched from cooperative surface vessels.)
- A submarine-mounted electromagnetic RV launcher is probably not a practical prospect for the next quarter of a century. Thus, submarine-based ballistic systems will continue to depend on rocket engines (perhaps nuclear in the far term) for accelerating their payload.

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Cruise Missiles

28. If the United States develops a ballistic missile defense, an obvious way for the Soviets to try to defeat it is to place greater emphasis on nonballistic strategic offensive systems. One of these is long-range cruise missiles, which remain in the atmosphere and are susceptible to further reduction of their IR, visible, and radar signatures, which are already small. In addition to attacking the target sets formerly allotted to ballistic missiles, cruise missiles could be potent defense suppression weapons. Using combinations of speed, stealth, and launch points near the United States, they could attack ground-based elements of the US BMD system, clearing the way for a subsequent ballistic missile attack.

29. A major disadvantage of cruise missiles is, of course, that if they can be detected, they can be brought under attack by fairly conventional air defense systems. This, however, might not be seen as a completely negative point by the Soviets, since the enormous expense needed to provide the United States with an effective air defense system would mean that these resources would not be available for other programs. In the longer term, visible and IR space-based lasers of the sort that might be incorporated in the endoatmospheric boost-phase segment of a United States BMD system would also be effective weapons against cruise missiles, again assuming they could be located. In the near term, submerged-launched versions of two Soviet long-range cruise missiles now under test, if deployed on submarines off the coast of the United States, could provide an initial circumvention of a BMD system.

30. Also by the mid-1990s, initial steps to apply stealth technology to cruise missiles could be taken by the Soviets. In all probability, these would take the form of modifications to missiles already in design or test. The Soviets also may choose to develop subsonic intercontinental cruise missiles. Their slow speed

would be offset by the Soviets' ability to launch them surreptitiously from the USSR and, in the midterm, by the use of stealth technology.

31. By the end of the midterm (2005), the Soviets probably could develop and start to deploy supersonic and hypersonic cruise missiles that would use stealth technology and speed to penetrate air defense systems. Submarine-launched cruise missiles with speeds in the range of Mach 3-5 could arrive at their targets in the same time period as ICBMs launched from the USSR. They would be difficult to detect because of their size, small IR signature, and small radar cross section. Using terminal guidance, these systems could have accuracies below 10 meters. Such missiles could perform many of the missions now assigned to ballistic missiles.

32. In the far term, the Soviets will be able to apply many advanced technologies to cruise missile design, if they now elect to begin work on them. Examples would be:

— Cruise missiles with an intercontinental subsonic cruise phase and supersonic or hypersonic terminal attack phase.

— Cruise missiles with very long (several days) preattack loiter times.

— Multimode cruise missiles capable of operating, for example, in submerged, aerodynamic, and ballistic regimes.

— Nuclear-powered intercontinental cruise missiles. US studies during the late 1950s and early 1960s demonstrated the feasibility of nuclear ramjet propulsion for a low-altitude, supersonic cruise missile, and open literature of the late 1950s demonstrated USSR understanding of the propulsion principles involved. Such a missile would be large by modern US standards (about 1.5 meters in diameter), but would have a greater payload capability, range, and ability to deploy advanced defensive electronics than present small cruise missiles.

Bombers

33. After a relatively long lull in which the Soviets produced no new bomber for intercontinental missions, they have begun testing a new aircraft, the Blackjack, which is clearly intended to be capable of intercontinental attack. It is expected that this bomber and its future variants will remain operational well into the next century. In addition, a new variant of the Bear bomber capable of carrying strategic cruise missiles to intercontinental ranges is now being deployed. Like cruise missiles, bombers are largely immune to space-based X-ray lasers and particle-beam weapons, but are susceptible to conventional air defenses and space-based lasers that operate in the visible and IR regions of the spectrum.

34. In the near term (to 1995):

— We expect the Soviets to deploy the Blackjack and to perfect its use as a carrier of cruise missiles and gravity bombs to intercontinental ranges. Various penetration aids, principally electronic warfare equipment, will be installed and upgraded. It is possible that the Soviets could adapt a large aircraft, perhaps the IL-86, to serve as a cruise missile carrier in addition to the new Bear variant.

35. In the midterm (1995-2005):

— Defense suppression weapons such as the US short-range attack missile could also be available for use on the Blackjack and possible stealth bomber in the early part of the midterm.

— The principal development expected is the application of stealth technology to manned aircraft. This may include a manned bomber.

— Some degree of hardening against ground- and space-based laser weapons could be incorporated on aircraft.

36. In the far term:

— Hypersonic aircraft are possible. These could incorporate stealth technology, considerable hardening against laser weapons, and extensive countermeasures against conventional antiaircraft systems.

— Nuclear propulsion for aircraft could be available. This would give greatly extended ranges without the need for refueling and might make indirect, high-speed, low-altitude approaches to a target practical.

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Conventional ABM Systems

37. The Soviets have an extensive program of R&D on conventional ABM systems that dates back to the 1950s. The program they are currently pursuing includes development of components which are suitable for use in an extensive deployment to protect key military, industrial, and urban population centers. These components include a large, quasi-transportable engagement radar, an endoatmospheric interceptor, and a missile guidance radar. Additionally, they are improving the Moscow ABM system by making it a two-layered system, increasing the number of interceptors to 100, and building a large, phased-array engagement radar. In addition, large, phased-array radars to upgrade their ballistic missile detection and tracking capabilities are under construction. Given their already extensive research and upgrade programs, we do not believe that the Soviets' initial response to a US BMD effort would involve any major alterations to their own conventional BMD deployment. At most, the Soviets might position themselves to be better able to break out with a conventional BMD deployment through acceleration of the potential timelines for construction and deployment. If the ABM Treaty were to be abrogated by either side, we believe the Soviets would undertake rapidly paced ABM deployments to strengthen their defense at Moscow and cover key targets in the USSR, and to extend protection to key targets east of the Urals. Such widespread defenses could be in place by the late 1980s or early 1990s.

38. In the midterm, the Soviets could choose to develop a more capable exoatmospheric interceptor, perhaps with a homing capability, multiple warheads, and a sensor capable of discriminating RVs from chaff and decoys. Also, for endoatmospheric or low-altitude engagement the Soviets could develop the capability to discriminate RVs from precision decoys. Supporting systems, such as more powerful computers and a reliable wideband communications system, would be needed and could be developed and deployed by the end of the century.

39. In the long term, the Soviets could pursue a variety of improvements to conventional ABM systems, such as multiple-warhead interceptors, dual mode exoatmospheric/endoatmospheric interceptors, mobile launchers, and so on. Some of these developments would probably eventually occur even without a US R&D program. These include general improvements in the capabilities of interceptors and radars. A US R&D program might cause the Soviets to accelerate the pace of these developments, but need not alter their fundamental nature.

Directed Energy Systems

40. The Soviet Union has had a large, military-sponsored, high-energy laser weapon program since the 1960s. One of the primary motivations for this effort is probably the development of ballistic missile defense weapons. Our best evidence in this area concerns a major program to develop the technology necessary for a ground-based laser weapon for terminal ballistic missile defense. Soviet research also has included a project to develop a space-based laser weapon, probably for ASAT applications initially, but we believe that the more difficult BMD mission is also of interest to them. The result of these longstanding and well-funded programs is that the Soviets are now on a par with, or lead, the United States in most of the directed energy weapons technologies.

41. [redacted] there is good evidence that in the late 1960s the Soviets were giving serious thought to both explosive and nonexplosive nuclear power sources for lasers of an unknown type. In any event, Soviet scientists are certainly capable of carrying on this kind of work and will undoubtedly do so now that there are reports of successful US tests and public discussion of nuclear-pumped X-ray lasers as potential BMD weapons.

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42. The Soviets are known to be aware of the potential of radiofrequency (RF) weapons, which would damage the electronics of target systems with intense fluxes of microwaves. They are world leaders in the development of certain types of high-power microwave generators applicable to RF weapons, and also exhibit great talent and creativity in constructing pulsed power systems that could drive such weapons. The utility of RF devices in the present context, except perhaps as antisatellite or air defense weapons, is unclear to us, and we are correspondingly uncertain of the likelihood that the Soviets will choose to develop

them for BMD. If they should do so, they are in a strong position to match or exceed any advances made in the United States or elsewhere.

43. There is good evidence of Soviet military-sponsored R&D projects on particle beam weapons (PBW), although work here is in an earlier stage and on a much smaller scale than that in lasers. Soviet particle beam weapon research might eventually have some ASAT or BMD applications, but the achievement of a prototype system for such uses would be at least 10 to 15 years in the future. DIA believes that a space-based PBW system, intended to disrupt the electronics of ballistic missiles and requiring significantly less power, could probably be developed and deployed in the 1990s.

44. Soviet directed energy programs already have important internal Soviet advocates, and support for them will be enhanced by aggressive US pursuit of directed energy weapons. We can expect the Soviets to continue or expand their laser BMD efforts, in part as a hedge against technical and strategic uncertainties. Continued or expanded Soviet effort on directed energy BMD weapons would provide them with the option of developing a counterpart Soviet defense to match any future US development and preserve the strategic balance, or to serve as leverage in arms control negotiations to limit or curb such weapons.

45. Besides forming a component of a BMD system, Soviet directed energy weapons could also be used to negate or destroy space-based elements of a US BMD system, since most laser weapons designed for BMD functions are even better ASAT weapons. High-energy lasers in orbit conceivably could have eventual application in an air defense role and be used for attacking unhardened targets on Earth.

46. We believe there is a high probability that a Soviet prototype high-energy laser ASAT weapon will be tested in low orbit by the early 1990s. A space-based laser of the 1-megawatt class could be tested in the late 1980s at the earliest, but prototype testing is more likely to occur in the early 1990s. If testing proves successful, an initial operational low-altitude system consisting of a few satellite weapons, each having an ASAT range in the hundreds of kilometers, could be available by the mid-1990s.

47. There is a moderate-to-high likelihood that the development of low-orbit space-based lasers, coupled with a heavy-lift launch capability, will result in testing of laser ASAT weapons in geosynchronous orbit by the late 1990s, although CIA ascribes a low probability to operational deployment by the year 2000. DIA believes that, while deployment of a geosynchronous space-based laser would probably take place after deployment of a low-altitude system, there is a moderate chance of deployment of a geosynchronous space-based laser by the mid-1990s. Space-based weapons for ballistic missile defense will require greater technological advances than those needed for an ASAT mission. Thus, the Soviets are unlikely to have a prototype space-based laser BMD system until at least the mid-1990s, or an operational system until after the year 2000. There is also some possibility that [redacted] could be ready for operational use by the end of the midterm.

48. In the long term, the Soviets will have had time to perfect shorter wavelength devices such as the free-electron and excimer lasers. These have several advantages over weapons operating in the infrared, including better coupling of the laser radiation to the target, and ability to produce a more intense flux on the target for a given diameter of output optics. In addition, most of these can be designed to operate with nuclear power sources, thus obviating the need to carry great amounts of fuel into orbit. Also in the far term, Soviet work on particle beam weapons could produce a workable space-based weapon for BMD or ASAT use.

Space Systems

49. The Soviet space program is unlikely to change markedly in response to the US BMD initiative. The program is well funded with a number of short-range and midrange goals that are not likely to change. However, the Soviet R&D effort could shift more toward developing components for ballistic missile defense and antisatellite use if the United States emphasizes space-based BMD, probably at the expense of the manned-space and communications satellite programs which have recently accounted for larger shares of Soviet space costs.

50. At present, we estimate that 17 new military and civil space systems will be tested, and most of

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these will be deployed, in the next 10 years. These new programs will result in improvements across the board in existing capabilities; in addition, the new space transportation system (shuttle) and an associated Saturn-V–class heavy lift launch vehicle will add a new dimension to the manned and unmanned Soviet programs. These new vehicles will be available in the late 1980s and will allow the Soviets for the first time to put payloads of 130,000 to 180,000 kilograms into low Earth orbit. The Soviet space program will have an increasing manned component: their shuttle, space tug, and space stations will be used to conduct technology-oriented research and development in space, including ASAT and perhaps BMD system development.